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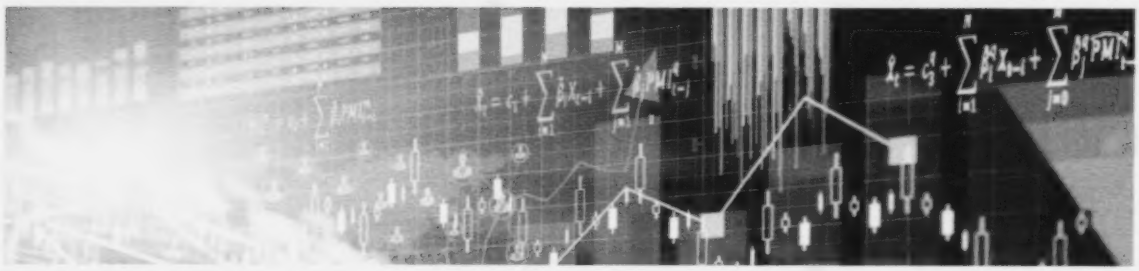
Staff Analytical Note/Note analytique du personnel 2018-25

What Is Restraining Non-Energy Export Growth?



by Dany Brouillette,[1] José Dorich,[2] Chris D'Souza,[3] Adrienne Gagnon[4] and Claudia Godbout[5]

Canadian Economic Analysis Department
Bank of Canada
Ottawa, Ontario, Canada K1A 0G9
[1]dbrouillette@bankofcanada.ca, [2]jdorich@bankofcanada.ca, [3]cdsouza@bankofcanada.ca, [4]agagnon@bankofcanada.ca, [5]cgodbout@bankofcanada.ca

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Abstract

This note summarizes the key findings from Bank of Canada staff analytical work examining the reasons for the recent weakness in Canadian non-energy exports. Canada steadily lost market share in US non-energy imports between 2002 and 2017, mostly reflecting continued and broad-based competitiveness losses. In addition to this evidence from the demand side, industry analysis points to supply constraints that are limiting export growth, such as physical capacity and shortages of skilled labour. Transportation bottlenecks, environmental and regulatory changes, and the inability to source raw materials also appear to be limiting export growth in some industries. Evidence suggests supply-side capacity constraints at the industry level as well. These constraints mainly reflect a decline in the factors of production, such as labour input and capital stock, which are likely related to the ongoing competitiveness losses. Simulations using the Bank of Canada's ToTEM model suggest that demand factors such as competitiveness issues explain most of the recent weakness in non-commodity exports. The simulations also indicate that a monetary policy reaction is required, independent of whether the weakness is driven by demand or supply factors. Staff expect broad-based competitiveness losses and structural supply factors to continue to restrain the growth of non-energy exports over the projection horizon, which extends until 2020.

Bank topics: International topics; Recent economic and financial developments; Trade integration; Monetary policy
JEL codes: F, F1, F10, F14, F17, E, E5, E52

Résumé

Cette note résume les principaux résultats des travaux d'analyse du personnel de la Banque du Canada examinant les raisons de la récente faiblesse des exportations canadiennes de biens non énergétiques. Entre 2002 et 2017, le Canada a vu diminuer de façon constante sa part du marché des importations américaines de biens non énergétiques, reflétant principalement la dégradation continue et généralisée de sa compétitivité. Outre cette observation du côté de la demande, l'analyse sectorielle tend à indiquer que des contraintes d'offre – ressources physiques insuffisantes et pénuries de main-d'œuvre qualifiée, par exemple – limitent la croissance des exportations. Dans certains secteurs, leur croissance pourrait également être freinée par la congestion des infrastructures de transport, les changements associés à l'environnement, les modifications réglementaires ainsi que l'incapacité de s'approvisionner en matières premières. Les données portent aussi à croire que des contraintes de capacité s'exercent du côté de l'offre au niveau sectoriel. Ces contraintes dénotent principalement une détérioration des facteurs de production – comme le facteur travail et le stock de capital – qui est vraisemblablement reliée à la perte continue de compétitivité. Les simulations réalisées à l'aide du modèle TOTEM de la

Banque du Canada donnent à penser que les facteurs de demande, comme les problèmes de compétitivité, expliquent en majeure partie la récente faiblesse des exportations hors produits de base. Elles mettent également en évidence la nécessité d'une réponse de la politique monétaire, peu importe que la faiblesse soit causée par des facteurs d'offre ou de demande. Selon le personnel de la Banque, les pertes de compétitivité généralisées et les facteurs d'offre structurels devraient continuer de freiner la croissance des exportations de biens non énergétiques au cours de la période de projection s'étendant jusqu'en 2020.

Sujets : Questions internationales; Évolution économique et financière récente; Intégration des échanges; Politique monétaire
Codes JEL : F, F1, F10, F14, F17, E, E5, E52

1. Introduction

Excluding services, Canadian non-energy exports (NEX) have been largely flat since mid-2014, although foreign activity has increased by close to 10 per cent over this period (**Chart 1**). This divergence has occurred at a time when the real Canadian effective exchange rate (CEER) depreciated by around 10 per cent, which would have been expected to support exports.

The weakness of NEX compared with fundamentals is not a new phenomenon. Over the past several years, Bank of Canada staff have devoted considerable effort to understanding the weakness of NEX relative to their fundamentals (i.e., relative prices and foreign activity). The result was a much-improved framework for forecasting Canadian NEX in the Bank's projection models. Two key improvements in the construction of the fundamentals were introduced:

- A measure of exchange rate (CEER) that accounts for the exchange rates of third-party competitors and captures shifts in global trade.[1]
- New and more comprehensive measures of foreign activity that includes a global real activity for Canadian exports (GRACE) and a foreign activity measure based on World Input-Output Tables (FAM-IO).[2]

Despite these improvements, the analysis at the time found that it was necessary to include a proxy for competitiveness issues faced by Canadian exporters to find a stable long-run relationship with foreign activity and the relative price of exports.[3] In practice, the downward trend in our competitiveness proxy implies that NEX have failed to grow in line with foreign activity, even after controlling for relative prices.

Until mid-2016, the improved framework explained movements in NEX relatively well. Over this period, however, the competitiveness proxy played an important role in explaining the softness of NEX compared with fundamentals. However, since mid-2016, NEX have disappointed once again, failing to keep pace with strong foreign activity growth, even when including our competitiveness proxy. As noted in the Bank of Canada's July 2018 *Monetary Policy Report*, the imposition of tariffs by the US administration and uncertainty regarding trade policies are

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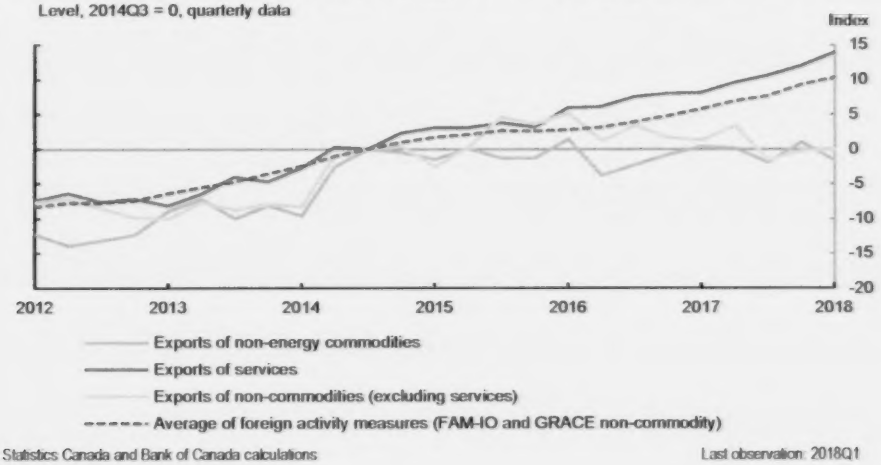
[1] See Barnett, Charbonneau and Poulin-Bellisle (2016).

[2] See Binette, Chernis and De Munnik (2017) and Alexander, Cayen and Proulx (2017).

[3] This competitiveness proxy for non-commodity exports is the Hodrick-Prescott-filtered share of manufacturing output in Canada, which has trended downward since 2000. This negative trend likely reflects a combination of several factors, including Canada's structural shift toward non-manufacturing production and the rise of Canada's manufacturing export competitors (such as Mexico and China). In the commodity export equation, a linear trend is used in LENS.

exerting a drag on NEX. Moreover, some idiosyncratic factors, such as the losses of auto production mandate in 2017, can explain some of this weakness.[4] However, even after accounting for these factors, a significant part of the weakness remains unexplained. This has reopened questions regarding the competitiveness of Canadian exports and the presence of other factors that could be restraining NEX, such as capacity constraints.

Chart 1: **Exports, excluding services and energy, have been largely flat since mid-2014**



Sources: Statistics Canada and Bank of Canada calculations Last observation: 2018Q1

In this note, we summarize the key findings from Bank of Canada staff analytical work examining possible drivers of the weakness in NEX. Section 2 presents the key findings from the note "Decomposing Canada's Market Shares: An Update," by Nicholas Labelle St-Pierre (2018). In this note, demand factors are analyzed using a shift-share analysis. This type of analysis decomposes movements in aggregate market shares into those related to actual shifts in product-specific market shares (referred to as competitiveness losses) versus shifts in the composition of import demand and the interaction between these two effects. Labelle St-Pierre also evaluates whether movements in relative prices can explain competitiveness losses. Section 3 analyzes whether supply factors could also be at play. To do so, we first use the summer 2018 *Business Outlook Survey* (BOS) results as well as industry analysis of export-oriented firms. We then build on the note "Characterizing Canada's Export Sector by Industry: A Supply-Side Perspective," by Taylor Webley (2018) to analyze supply constraints from the factors of production. Section 4 summarizes the analysis and the results from the note "Weakness in Non-Commodity Exports: Demand versus Supply Factors," by José Dorich, Vadym Lepetyuk and Jonathan Swarbrick (2018). In this note, ToTEM simulations are conducted to assess whether the source of weakness in non-

[4] Losses of auto production mandate in 2017 can account for around one-third of the unexplained weakness in non-commodity exports.

commodity exports is related to negative demand shocks or binding supply constraints. Section 5 concludes.

2. Canada continued to lose market share from 2014 to 2017, despite the depreciation of the Canadian dollar

Updating and expanding the shift-share analysis of Barnett and Charbonneau (2015), Labelle St-Pierre (2018) decomposes Canada's market shares of imports of non-energy goods by the United States, Europe (EU-28)[5] and China into three parts: [6]

- **Competitiveness:** changes due to shifts in product-specific market shares
- **Preference:** changes due to shifts in product-specific import shares, i.e., total imports of a given product over total imports across all product categories considered
- **Interaction term:** the compounded effects of shifts in competitiveness and preferences[7]

The main results of this analysis can be summarized as follows:

- Canada's market share of US imports of non-energy goods gradually declined from 16 to 10 per cent from 2002 to 2017 (or about 0.4 percentage points per year).
- Although the CEER depreciated by roughly 10 per cent between 2014 and 2017, Canada continued to lose market share at about the same rate as over 2002 to 2014, mainly reflecting product-specific losses (referred to as competitiveness) (**Chart 2**).
- Competitiveness losses remain widespread across export categories (**Chart 3**).
- Until 2009, shifts in preference weighed on Canada's market share in the United States for motor vehicles and parts as well as for forestry products and building and packaging materials (**Chart 4**).[8] These preference adjustments have since been limited.
- Since 2009, Mexico has had the greatest gains in US imports of non-energy goods, while China's gains have been more limited (**Chart 5**).
- Although services exports have been a key growth engine of NEX over recent years, Canada has also been losing market share in this sector. This can largely be explained by competition from emerging market economies such as India (**Chart 6**).

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[5] In the rest of this note, we refer to the European Union (which includes 28 member states since July 2013) as Europe.

[6] The United States, Europe and China captured more than 85 per cent of Canada's exports of non-energy goods in 2017.

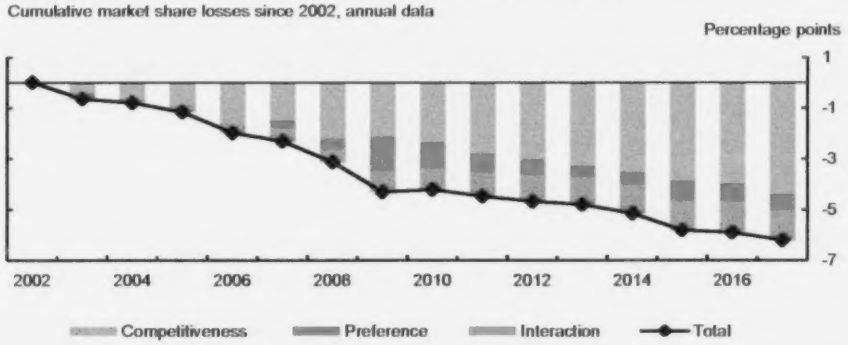
[7] The interaction term captures the added negative effect of losing (gaining) market share in an expanding (shrinking) market or the added positive effect of gaining (losing) market share in an expanding (shrinking) market.

[8] The exact definition of product categories can be found in Labelle St-Pierre (2018).

- Canada's market shares of imports of non-energy goods by Europe and China have been stable over recent years. However, in each case, one sector's gain offsets competitiveness losses in a broad range of sectors.
    - Canada's market share in Europe remained roughly stable if we include gold shipments to the United Kingdom. This category offsets losses made in a broad range of sectors such as forestry and electronics.
    - Canada's market share of China's non-energy imports has hovered around 1 per cent. Competitiveness losses in a broad range of sectors are offset by gains in farm, fishing and intermediate food products.
- While relative price movements helped explain Canada's competitiveness losses in motor vehicles and parts as well as consumer goods until 2014, they cannot explain the ongoing and broad-based competitiveness losses.[9, 10]

Chart 2: **Most of the decline in Canada's market shares of US imports of non-energy goods since 2014 has resulted from competitiveness losses**

Cumulative market share losses since 2002, annual data



Example: The orange bar shows -4.4 percentage points for 2017, meaning that shifts in competiveness explain 4.4 percentage points of the 6.2 percentage points drop in Canada's market share of US imports of non-energy goods from 2002 to 2017.

Sources: UN Comtrade and Bank of Canada calculations

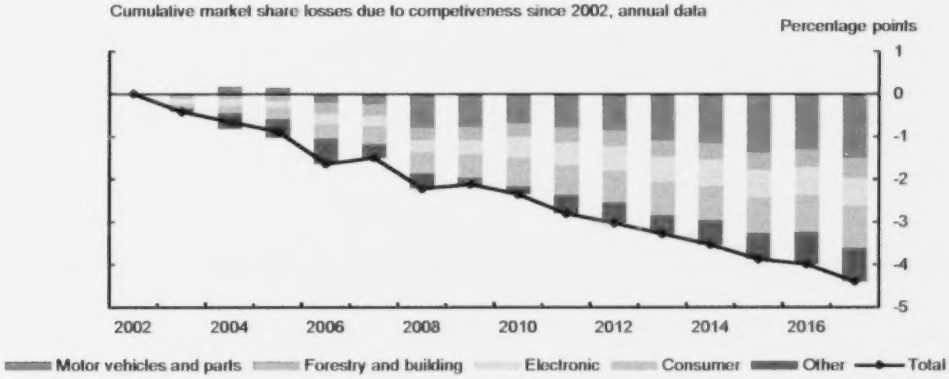
Last observation: 2017

[9] To reach this conclusion, Labelle St-Pierre (2018) takes the basket of non-energy goods exchanged between Canada and the United States in 2002 and prices it with Canadian, Mexican and Chinese prices from 2002 to 2017.

[10] This analysis is subject to several caveats; see Labelle St-Pierre (2018) for details.

Chart 3: **Losses in competitiveness in US imports of non-energy goods since 2002 are ongoing and widespread among sectors**

Cumulative market share losses due to competiveness since 2002, annual data



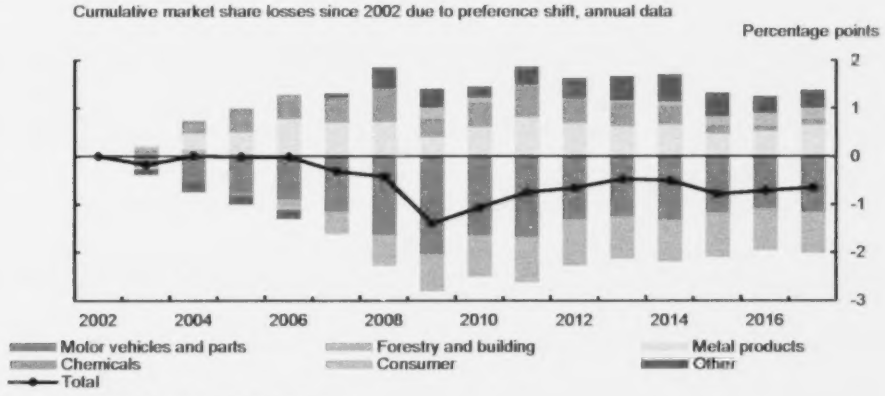
Note: This is a decomposition of the orange bars from Chart 2.

Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

Chart 4: **Shifts in preference among US imports of non-energy goods have been largely stable since 2012**

Cumulative market share losses since 2002 due to preference shift, annual data



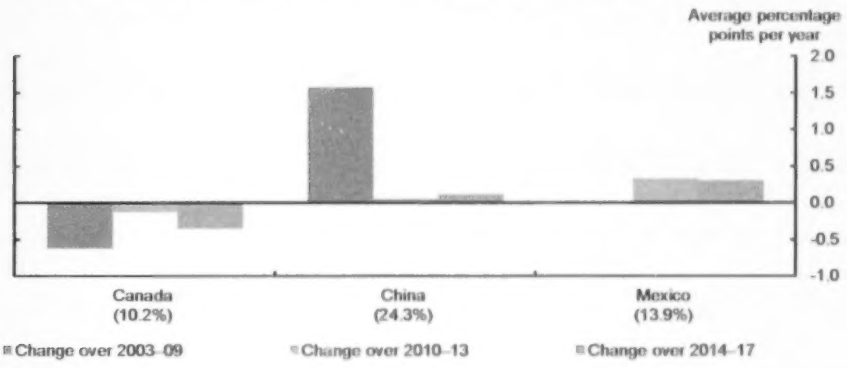
Note: This is a decomposition of the blue bars from Chart 2.

Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

Chart 5: **Mexico has made the largest gains in US imports of non-energy goods since 2009, while China's gains have been more limited over that period**

Shift in market share by country over different periods. Percentages indicate the market share in 2017.

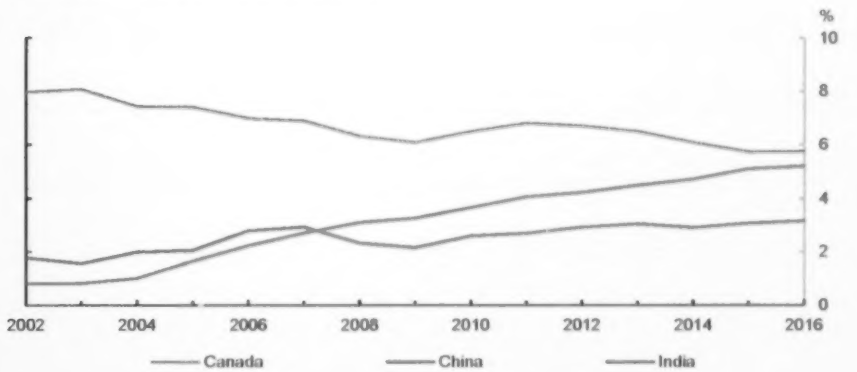


Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

Chart 6: **Canada's market share of US imports of services has gradually been eroded, while India has made significant gains**

Market share of US imports of services, annual



Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2016

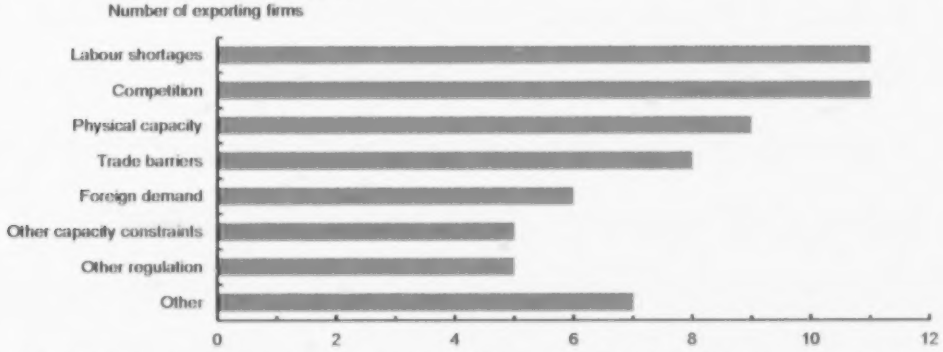
3. Supply-side factors also appear to be limiting NEX growth

There are two ways supply-side constraints can limit exports. First, the number of firms in an industry may decline, reducing the overall export capacity in this industry. Second, the remaining exporting firms may face constraints that limit their ability to increase exports when faced with stronger foreign demand. In this section we show that, while we do not see much change in the number of exporting manufacturing firms over recent years, exporting firms have identified supply-side constraints limiting their exports. Evidence suggests there are supply-side capacity constraints at the industry level as well, reflecting mainly a decline in the factors of production such as labour input and capital stock.

Firms identify several supply factors limiting their ability to export

In interviews for the summer 2018 BOS, exporting firms identified labour shortages and physical capacity constraints as two of the main impediments to export growth (**Chart 7**).[11]

Chart 7: **Labour shortages and physical capacity constraints are two of the main impediments to exports**



Note: Firms interviewed for the *Business Outlook Survey* were asked the following question: "What is driving/holding back your export volumes for the next 12 months?" (Forty-nine firms were interviewed).

Source: Bank of Canada

Additional in-field research points to other supply-side constraints such as the difficulty to source raw materials, environmental and regulatory challenges and transportation bottlenecks. **Table 1** summarizes the key supply constraints mentioned by large exporting firms in publicly available information as well as during recent BOS and ad hoc interviews. Factors limiting export growth are classified into two categories: temporary and permanent. Constraints such as transportation bottlenecks and, to a lesser extent, the need for skilled labour should be temporary. In contrast, several industries face more permanent constraints such as the reduced supply of raw materials and regulatory constraints. For example, the reduced supply of timber following the 2017 wildfires in British Columbia as well as the pine beetle outbreak will likely permanently reduce exports in the forestry industry. Firms also reported that the presence of regulatory constraints is limiting the growth of the supply of raw materials for several subsectors (especially fish and aquaculture).

[11] See *Business Outlook Survey*, Summer 2018.

Table 1: **Supply-side factors limiting exports for selected exporting firms**

Temporary factors	
Transportation bottlenecks (railcar shortages)	Forestry and logging (lumber) Agriculture (grains) Metals and mineral products
Recruiting skilled labour	Research and development, intellectual property and information technology (commercial services) Industrial machinery, equipment and parts
Physical capacity constraints	Food and beverage manufacturing*
Other (restructuring, wildfires)	Forestry and logging (lumber) Aerospace
Permanent factors	
Sourcing raw material	Forestry and logging (lumber) Agriculture (fishing) Food and beverage manufacturing
Environmental and regulatory constraints	Food and beverage manufacturing Agriculture (fishing) Forestry and logging (lumber)

* During the BOS interviews some firms in the primary and manufacturing sectors reported that physical capacity constraints are an impediment to exports.

Although existing exporters have mentioned supply-side constraints that are limiting their exports, this analysis is qualitative, making it difficult to derive quantitative implications. Getting a comprehensive picture of overall export capacity requires us to analyze industry-level production inputs such as the number of firms, capital stock, labour input and productivity.

The number of exporting firms in the manufacturing sector has remained largely stable

The number of manufacturing exporters remained largely stable at around 16,000 between 2010 and 2017.[12] However, this masks different dynamics at the sector level.[13] For example, there was an increase of 20 per cent in the number of exporting firms in the food and beverages manufacturing industries but a decline of around 10 per cent in wood, paper and printing as well as in textile and clothing industries.

The relative stability in the number of manufacturing exporting firms once we exclude the industries mentioned above suggests that if there is a reduction in export capacity, it is not driven

[12] See Statistics Canada, Trade Exporter Characteristics, Table 12-10-0092-01. The change in the stock of firms is not equal to net entry because of changes in firm structure, for example, merger and acquisitions.

[13] At the sector level, another factor explaining the discrepancy between the change in the stock of firms and net entry is the reclassification of firms in different sectors.

by a decline in the number of firms. However, these data must be interpreted with caution because they do not control for the composition of firms (e.g., size) or export intensity.

Canada's export capacity is likely limited by firms' decisions to invest in new operations abroad

A significant share of Canadian exports is from multinational foreign-owned firms.[14] This implies that the investment decisions are made in a global context and consider a broad set of factors.

Firms from several industries have identified a preference to invest outside of Canada, stating strategic reasons (e.g., local knowledge, proximity of customers), competitive factors (e.g., operating costs, government support) and domestic supply constraints (e.g., lumber).[15, 16] In some cases, firms increasingly choose to serve foreign demand through their local operations abroad, rather than exclusively through exports, which ultimately acts as a drag on export capacity in these industries.

Findings from Coiteux et al. (2014) suggest that the shift in the location of production capacity, at least in the forestry and the motor vehicle parts industries, might help explain the weakness in NEX until 2015. The auto industry offers a striking example of a shift in production reducing export capacity. Since 2009, Canada's share of North American auto production has steadily declined, to the benefit of Mexico and the southern US states (**Chart 8**). In other sectors, outward investments are not a substitute for domestic exports but a complement as firms build a platform to facilitate their exports.

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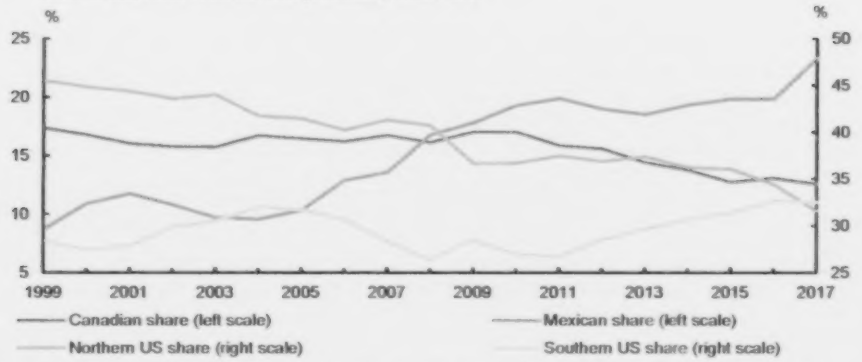
[14] Based on Statistics Canada data, in 2015, the share of merchandise exports accounted for by foreign-owned firms was around 50 per cent.

[15] In recent years some major Canadian lumber producers have invested to increase capacity in the United States because of limited supply of fibre in Canada and proximity to key markets. Some Canadian retailers have opened shops abroad to access foreign clients.

[16] Net foreign direct investment flows (the difference between Canadian direct investment abroad and foreign direct investment in Canada), excluding the energy and mining sector, reached –$65 billion in 2017, down from around –$9 billion in 2014. This represented both a decline in inflows and an increase of outflows. Data for early 2018 are, however, more encouraging, posting the first positive figure since mid-2015.

Chart 8: **North American auto production has shifted south**

Share of total North American auto production, annual data



Note: Southern US share includes Alabama, Delaware, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, Oklahoma, South Carolina, Tennessee, Texas and Virginia. Northern US share includes California, Illinois, Indiana, Kansas, Massachusetts, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania and Wisconsin.

Sources: WardsAuto and Bank of Canada calculations

Last observation: 2017

Capital stock and labour inputs have declined in the non-energy sector, limiting its export capacity

The persistent decline in Canada's market share appears to have gradually eroded the production capacity in the non-energy sector. **Chart 9** shows that apart from the service sector, both total labour input and capital stock have declined over time in goods-producing industries.[17] Indeed, Webley (2018) finds that since 2002, 16 of 18 non-energy industries analyzed have reduced their capital stock or total labour input, limiting production capacity in the absence of offsetting increases in productivity. Furthermore, 13 of 18 industries (56 per cent of NEX) reduced both factors of production between 2002 and 2016.

Webley (2018) examines the implication of recent supply-side trends for average NEX growth over the Bank's July 2018 *Monetary Policy Report* (MPR) projection horizon (2018 to 2020).[18] NEX is projected to 2020 using the following supply-side assumptions for each industry:

[17] Total factor productivity by industry is estimated as the residual from Cobb-Douglas production functions using capital and labour as the only inputs to production. Consequently, this measure of productivity captures technological progress in addition to the impact on growth from non-capital and labour inputs and statistical anomalies such as measurement error.

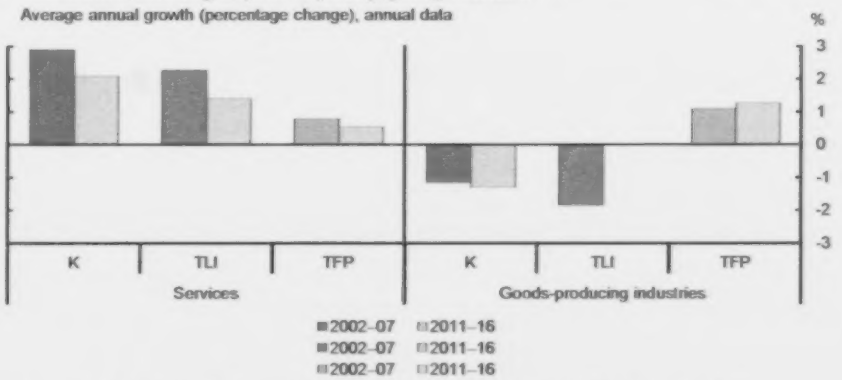
[18] The figures reported in this section are generated independently of the Bank of Canada staff projections and are not directly comparable to the July 2018 MPR projections. Additionally, the framework used in this note uses only annual data; consequently, the 2018 figures do not account for the quarterly patterns of growth in 2017 and the first quarter of 2018, which are very significant in determining annual average growth rates in 2018.

1. Total factor productivity, capital stock and total labour input grow at their average 2011–16 pace.[19]
2. Capacity utilization remains constant.
3. The ratio of exports to production remains constant.

These supply-side assumptions suggest that NEX could grow approximately 2 per cent per year on average over the projection horizon, compared with projected average foreign activity growth for NEX of about 3.3 per cent.[20] While NEX growth could temporarily exceed this growth rate given higher export intensity, this would not be sustainable unless accompanied by much stronger growth in investment, employment or total factor productivity in the export sector.[21] Overall, the industry-level production constraints imply that without stronger overall investment and hiring or a reallocation of resources toward the export sector, it would be difficult for NEX to make up for their recent disappointment relative to foreign activity. Such a reallocation of resources could occur for instance following significant improvement in relative prices that would make Canadian goods more competitive or a shift in preference toward Canadian goods. However, given the current uncertainty around trade policy, it is difficult to envision such a reallocation of production capacity over the projection horizon.

Chart 9: **Capital stock and total labour inputs have declined in goods-producing industries, limiting export capacity going forward**

Average annual growth (percentage change), annual data



Notes: Mining and primary metal manufacturing are excluded from the figures presented in this chart because of their unique trends.
K = Capital stock, TLI = Total labour input, TFP = Total factor productivity

Sources: Statistics Canada and Bank of Canada calculations

Last observation: 2016

[19] We use average total factor productivity growth for services between 2013 and 2016 instead of the average between 2011 and 2016 because productivity growth was weak in the services sector in 2011–12 but has been consistently stronger since.

[20] Figure as of the July 2018 MPR projection. Foreign activity growth for NEX is the average of foreign activity growth for non-commodity and non-energy commodity exports, weighted by export shares.

[21] Webley (2018) provides details on alternative assumptions for the factor of production to have NEX growth in line with foreign activity.

It is important to note two key points from this supply-side analysis. First, the weakness in the industry-level supply-side trends is not independent from, and indeed is likely driven by, the competitiveness challenges discussed in Section 2. Second, these supply-side trends are to a large extent already embedded in the Bank of Canada staff projection for potential output.

4. Macroeconomic analysis suggests that demand factors likely account for most of the recent weakness in non-commodity exports

The previous sections suggest two distinct mechanisms that may account for the recent weakness in Canadian non-commodity exports: first, a demand-driven mechanism associated with competitiveness challenges, and second, a supply-driven mechanism associated with capacity constraints. Dorich, Lepetyuk and Swarbrick (2018) use ToTEM to shed light on the plausibility of each of these two mechanisms from a macroeconomic perspective. In this section, we summarize their analysis and main findings.[22]

Figure 1 illustrates the two mechanisms in terms of the demand and supply of Canadian non-commodity exports. Suppose that demand and supply initially coincide at point D. All else being equal, a rise in foreign activity along the lines witnessed over the period from the first quarter of 2017 to the first quarter of 2018 would cause the demand curve to shift outward from D_0 to D_1, resulting in a new equilibrium at point B. However, the fact that non-commodity exports have remained largely flat since the fourth quarter of 2016 suggests that all else has not held equal. In particular, the demand-driven mechanism described above involves negative demand shocks that offset the shift in foreign activity, driving the demand curve back to D_0 while leaving the overall equilibrium unchanged at point D. In contrast, the supply-driven mechanism involves capacity constraints that temporarily force the economy onto the vertical supply curve S_1, leading to an equilibrium at point S rather than point B. Both mechanisms thus have the same implications for the quantity of non-commodity exports, while the supply-side mechanism naturally leads to a higher price.

[22] Details on the simulations can be found in Dorich, Lepetyuk and Swarbrick (2018).

Figure 1: **Demand and supply in the non-commodity export sector**

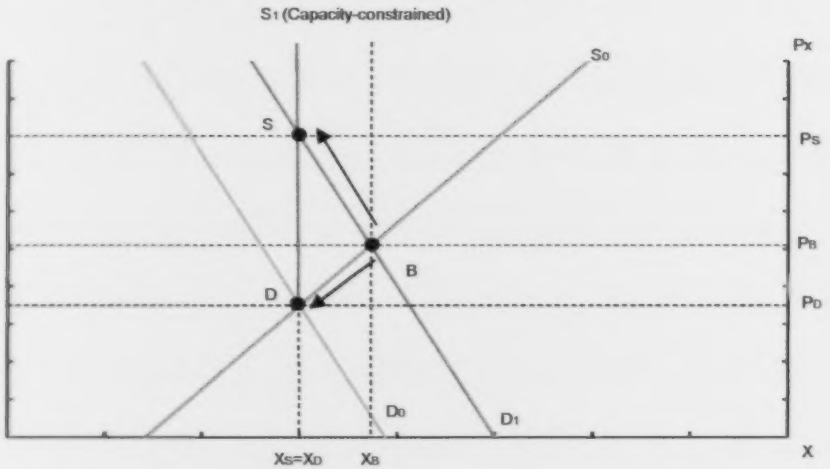
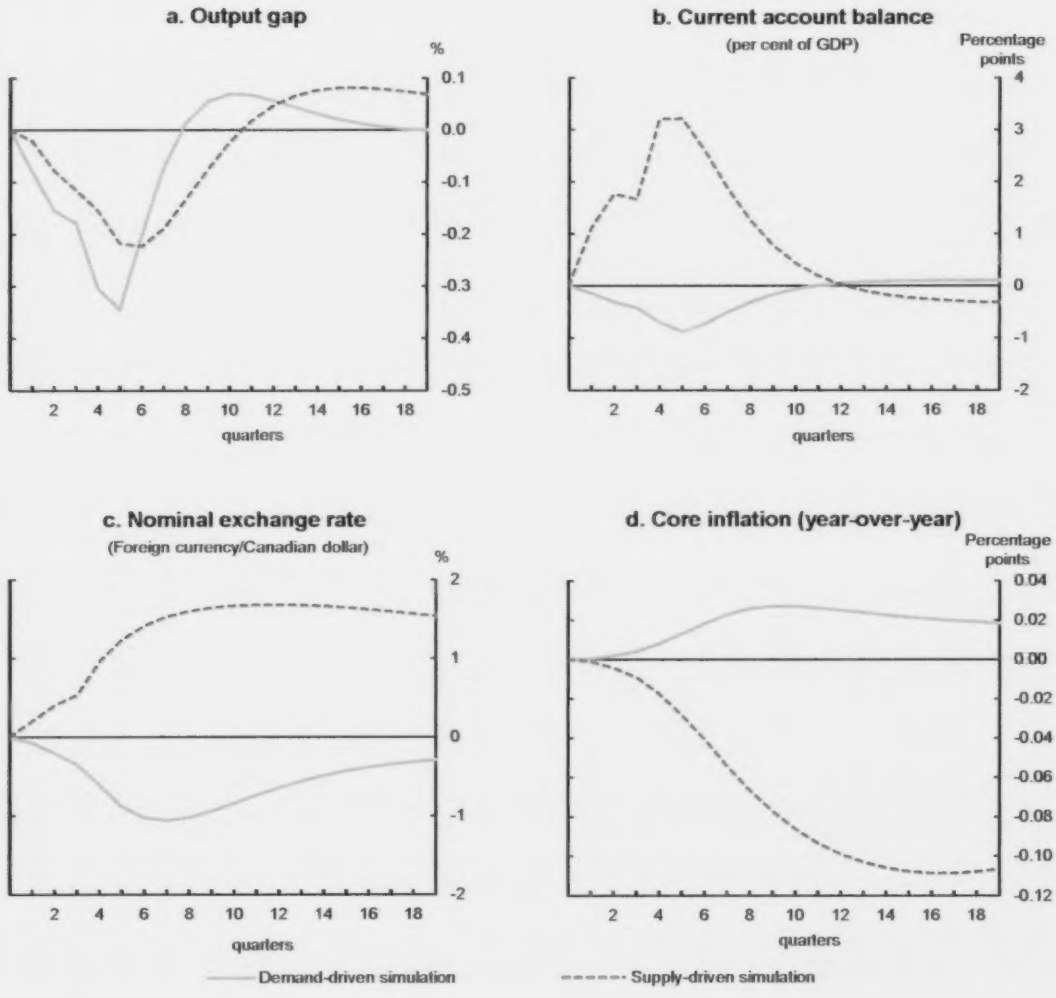


Figure 2 illustrates the evolution of key macroeconomic variables under simulations that are meant to capture the demand and supply mechanisms described above. The demand-driven simulation gives the economy's response to a sequence of negative demand shocks that have been calibrated to reproduce the weakness in non-commodity exports relative to foreign activity observed since the fourth quarter of 2016, essentially forcing the equilibrium to move from point B to point D. The supply-driven simulation then repeats using supply shocks that force the equilibrium to move from point B to point S.[23]

In the demand-driven simulation, negative non-commodity export demand shocks cause both the quantity and the price of non-commodity exports to be lower than would be the case at point B. As a result, Canadian income is relatively lower. Negative income effects then reduce aggregate demand, pushing down the output gap. In response, the interest rate goes down. The Canadian dollar depreciates, due to both the response of the interest rate and an increase in the country-specific risk premium stemming from a reduction in the current account and associated depletion of net foreign assets. Finally, the depreciation of the Canadian dollar leads to higher inflation.

[23] The shocks in each simulation are calibrated to match the weakness in non-commodity exports relative to foreign activity from the fourth quarter of 2016 to the first quarter of 2018. From the second quarter of 2018, the shocks dissipate with a moderate degree of persistence.

Figure 2: **Evolution of key macroeconomic variables**



In the supply-driven simulation, the supply shocks lead to a lower quantity and higher price for non-commodity exports, relative to what would be the case at point B. The price effect dominates in terms of its implications for the current account, leading to a lower country-specific risk premium and an appreciation of the Canadian dollar.[24] This appreciation then leads to lower inflation.

[24] The size of the price effect depends on the price elasticity of the demand for non-commodity exports. The higher this elasticity is, the smaller the size of the price effect. Given different reasonable values for this elasticity, ToTEM consistently predicts that the price effect dominates in terms of the implications for the current account.

The two simulations have similar implications for the output gap, though inflation is lower in the supply-driven simulation. This leads to a lower interest rate under the supply-driven simulation because the interest rate response in ToTEM is driven by a Taylor rule that reacts to inflation and the output gap.[25] Overall, both simulations call for a lower interest rate than would be the case at point B.

Because the simulations match the evolution of non-commodity exports relative to foreign activity since the fourth quarter of 2016, comparing the predictions of the simulations with the observed outcomes can shed light on the source of weakness in non-commodity exports. The data show that the price of non-commodity exports has decreased by 2.0 per cent from the fourth quarter of 2016 to the first quarter of 2018. Moreover, the current account balance as a share of GDP has declined by 1.4 percentage points, mainly reflecting a reduction of 1.2 percentage points in the ratio of non-commodity exports to GDP over this period. These aggregate data thus suggest a dominant role for demand factors in explaining the weakness in non-commodity exports since the end of 2016.[26]

5. Concluding remarks

While foreign activity has been strong recently, NEX growth has remained modest. Bank of Canada staff analysis finds that both demand and supply factors are at play.

On the demand side, competitiveness issues appear to explain most of Canada's market share losses over recent years. From a macroeconomic perspective, model simulations also suggest that the weakness in non-commodity exports since the end of 2016 primarily reflects demand factors such as competitiveness challenges. On the supply-side, some of the constraints such as transportation bottlenecks and the lack of skilled labour are likely temporary and should dissipate over the projection horizon. However, the production constraints at the industry level imply that without stronger overall investment or a reallocation of resources toward the export sector, it would be difficult for NEX to make up for their recent disappointment. Given the current uncertainty around trade policy, it is difficult to envision such a reallocation of production capacity over the projection horizon.

Given the importance of our competitiveness proxy in explaining the weakness of NEX over recent years, future work should examine a broader set of variables to understand the drivers behind Canada's competitiveness challenges and how they are likely to evolve going forward. These factors could include our relative growth prospects compared with other competitors as well as the ease of doing business. Controlling for cross-border production sharing might also

[25] In particular, the interest rate reacts to expected year-over-year inflation four quarters ahead and the output gap.
[26] The Canadian dollar appreciated from the fourth quarter of 2016 to the first quarter of 2018. However, given the increase of commodity prices over this period, this appreciation is not interpreted as evidence of supply factors.

help to get a clearer picture of Canada's competitiveness relative to other countries. Finally, incorporating additional supply factors into our export equations could be valuable.

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